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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY, DOCKET NO.	CONFIRMATION NO.
10/540,916	07/21/2005	Massimo Bergamasco	05086	8712

23338 7590 10/16/2006

DENNISON, SCHULTZ & MACDONALD  
1727 KING STREET  
SUITE 105  
ALEXANDRIA, VA 22314

EXAMINER

RAEVIS, ROBERT R

ART UNIT	PAPER NUMBER
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2856

DATE MAILED: 10/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/540,916

Applicant(s)

BERGAMASCO ET AL.

Examiner

Robert R. Raevis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) 20-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/29/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

Claims 14-17,18,19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 14, how does an element with a neutral axis define ("defining", line 6) a line? (Actually, it does not; unless, of course, .) Also, "parallel to the neutral axis" is not consistent with "independently of shape of said line", as the former suggests a straight line, while the latter suggests that the same line may be something other than parallel to the neutral axis (for example, a line in the shape of a loop).

As to claims 22,24,26, "said first and said second object" lack antecedent basis. How does the element with a neutral axis define a line? (Actually, it does not.) Also, "parallel to the neutral axis" is not consistent with "independently of shape of said line", as the former suggests a straight line, while the latter suggests that the same line may be something other than parallel to the neutral axis (for example, a line in the shape of a loop).

Claims 15 calls for a "channel" and "medium" (i.e. claim 16's cable), and also the "line". Is the "line" the same as, or part of, the "channel"? Isn't the same element being claimed twice? After all, it is the change in length of the portion of the flexible element (i.e. the channel?) that is being measured, and claim 1 says that variation in length of the line is being measured. If the line is not the medium (as argued on p. 9, 2<sup>nd</sup> to last

paragraph of Remarks), then the line must be either the channel or a part of the channel. Somehow, either the channel or medium define is the "line".

Claims 14,15,18,19 are rejected under 35 U.S.C. 102(b) as being anticipated by Slocum.

As to claims 14,18,19, Slocum teaches (Figure 2b) a method for measuring relative rotation of a first robot object relative to a second, including: arranging a flexible element 302 extending between two joints, the element having a neutral axis, the beam having a line (i.e. beam 303) that is spaced from the neutral axis and parallel to the neutral axis when the flexible element 302 is straight; and measuring variation of length of beam 303 during relative rotation, the rotation being proportional to the length variation.

As to claim 15, one end of the beam 303 slides ("slide" (col. 4, line 39) in measuring device that is attached to flexible element. The beam slides in a channel.

Claim 14,18,19 are rejected under 35 U.S.C. 102(b) as being anticipated by Danisch.

Danishch teaches (Figure 1) a sensor, including: flexible element 11 having neutral axis, with a fiber 13 spaced from the neutral axis that extends across the element; and means 16 for measuring "displacement" (col. 8, line 61). The sensor is used in a method of sensing strain.

Danishch does not state that there are objects on the beam.

As to claims 14,18,19, it would have been obvious to employ objects on the ends of the beam 11 as Danisch teaches (col. 3, lines 35+) use of such a strain sensing system to measure displacement between two objects (for example, "joint angles and deflections on robots" (col. 2, line 63)).

Claims 14,18,19 are rejected under 35 U.S.C. 102(b) as being anticipated by Hodac.

Hodac teaches a sensor, including (Figure 1, Para 32-35): flexible element 12 extending between two objects 1,1, and an optical fiber on the element; means 28 to measure angular deflection by detecting variation in distance between the elements (Para 33).

As to claims 14,18,19, the relative rotation is proportional to the length variation over at least a small range of rotation.

Claims 14,15,18,19 are rejected under 35 U.S.C. 102(b) as being anticipated by Challis.

As to claims 14,18,19, Challis teaches a method to measure rotation, including: arranging a flexible element 4 between two objects (36 and 88), the element having a neutral axis (line 28), and defining a spaced line (line along the exterior of element 4); and measuring variation in length of the exterior line relative to the neutral axis 28 with instrument 72.

As to claim 15, note the channel in element 4, and that the line may be deemed to be on the *interior* of wall 40 and parallel to axis 28 in Figure 3. Also, the axis 28 also is fiber that is employed in transmitting a signal (the signal being the movement of element 4 relative to cable 28 in Figure 4).

Claims 16,17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challis.

As to claim 16, the fiber is suggestive of a small cable to provide for strength.

As to claim 17, note that the end of cable 28 that's in instrument 72 moves.

Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Hindes.

Hindes teaches a sensor, including: flexible element 12 with wires 18,19 therein, and means 24,26 to measure longitudinal movement of the fiber, the longitudinal movement is proportional to angular displacement. Reference is made to the "neutral" (col. 3, line 10) axis, and "single plane" (col. 3, line 17).

The rejection(s) applying Hindes was withdrawn as there is not measuring of relative rotation of a first object relative to a second object.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert R. Raevis whose telephone number is 571-272-2204. The examiner can normally be reached on Monday to Friday from 5:30am to 3pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams, can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

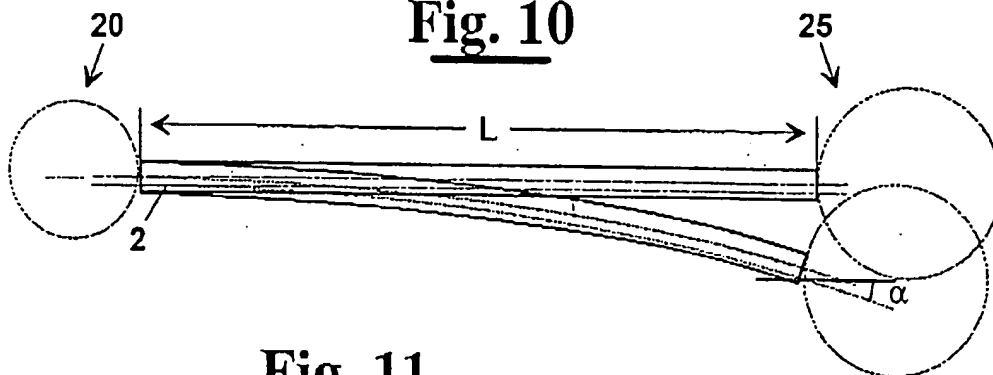
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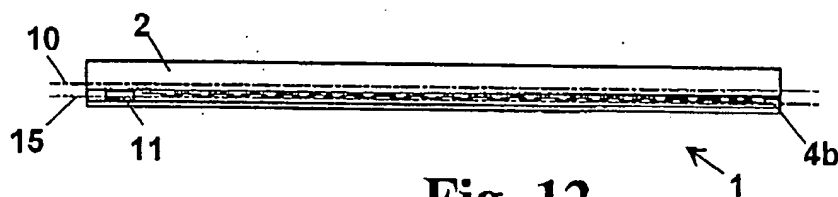




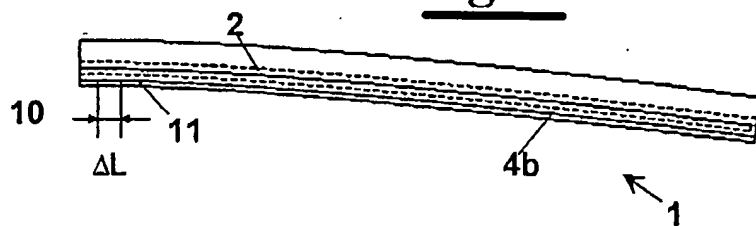
**Fig. 10**



**Fig. 11**



**Fig. 12**



**Fig. 13**

